



HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
RADIO AND TELEVISION

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94-131
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BY NEXT BUSINESS DAY

January 6, 1995

Mr. William F. Caton
Office of the Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, DC 20554

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Dear Mr. Caton:

On behalf of Hammett & Edison, Inc., Consulting Engineers, enclosed are three copies of our comments to MM Docket 94-131 concerning the processing of MDS and ITFS applications. The comment deadline is January 9, 1995, so these comments are timely filed.

Sincerely,

Dane E. Ericksen

jk

Enclosures (3)

cc: Mr. Philip M. Mustain (w/ 1)
Mr. Harry W. Perlow (w/ 1)
Robert J. Rini, Esq. (w/ 1)

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of)
)
Amendment of Parts 21 and 74 of the)
Commission's Rules With Regard to)
Filing Procedures in the Multipoint)
Distribution Service and in the)
Instructional Television Fixed Service)
)

MM Docket No. 94-131

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To: The Commission

Comments of Hammett & Edison, Inc.

The firm of Hammett & Edison, Inc., Consulting Engineers, respectfully submits these comments in the above-captioned proceeding relating to the processing of Multipoint Distribution Service (MDS) and Instructional Fixed Television Service (ITFS) applications. Hammett & Edison, Inc. is a professional service organization that provides consultation to commercial and governmental clients on communications, radio, television, and related engineering matters.

I. Qualifications of Hammett & Edison, Inc.

1. Hammett & Edison, Inc. is well qualified to make comments on this matter, as it has designed and prepared the engineering portions of MDS and ITFS applications for scores of such stations over the last 25 years, including "wireless cable" stations in markets such as New York, Los Angeles, San Francisco, San Diego, Las Vegas, Portland, Hawaii, and Reno.

II. Proposed FCC Interference Calculations Are Too Simplistic

2. The Commission proposes that its staff undertake the interference calculations necessary to ensure that new wireless cable stations, or modifications to existing wireless cable stations, provide the required interference protection to all existing, authorized, or proposed stations.* The Commission proposes to do this only on the basis of "free-space" path loss calculations, only on the basis of the equivalent isotropic radiated power (EIRP) in the horizontal plane, and apparently proposes to forgo any relaxation of the required desired-to-undesired (D/U) signal ratio for co-channel stations employing standard or precision frequency offsets. Hammett & Edison opposes this simplistic approach as grossly spectrum inefficient, as it would preclude channel re-use in

* Notice of Proposed Rule Making (NPRM), at Paragraph 15.



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those areas where a combination of natural terrain shielding, cross polarization, and the use of frequency offsets would ensure that no mutual interference will occur.

3. Interference studies based only on the EIRP in the horizontal plane would ignore the fact that many wireless cable stations are located on mountain tops and employ significant amounts of electrical or mechanical beam tilt or, in some cases, a combination of electrical and mechanical beam tilts. The reason for such complex designs is to focus the station's power at depression angles where substantial populations exist, and to not waste power in the atmosphere, towards the horizontal plane, or towards the radio horizon. Designs that do not incorporate optimal beam tilt are therefore spectrum inefficient, particularly when natural terrain obstructions would effectively block the impressive coverage that would appear to exist based on simplistic free-space calculations.

4. To not allow a reduced D/U ratio for co-channel stations employing standard or precision frequency offsets would also be inefficient. Relaxations of at least 6 to 17 dB are possible for co-channel wireless cable stations employing offsets. There is no reason why the Commission should not acknowledge and allow this proven interference reduction technique.

5. The Commission proposes generally only to collect data on a proposed station's EIRP, with no data supporting its derivation.[†] It would be naive of the Commission to dispense with the current requirement to document how a proposed EIRP was calculated. Details of transmitter power output, combiner losses, transmission line losses, and transmitting antenna parameters are important to allow others to check the accuracy of the claimed EIRP values. This is particularly true when electrical and/or mechanical beam tilts are employed, since the EIRP at the horizontal can be drastically affected. For example, a typical 16-bay omnidirectional wireless cable transmitting antenna will have an elevation pattern half-power beamwidth of 3°. If 1.5° of electrical beam tilt and 1.5° of mechanical beam tilt are proposed, the EIRP at the horizontal would vary from 3% of the main beam power (in the direction of the mechanical tilt), to 55% of the main beam power (at azimuths perpendicular to the direction of the mechanical tilt), to 100% of the main beam power (in the reverse directions of the mechanical tilt). Interference studies based only the EIRP in the horizontal plane would likely be worthless, since any proper design would target potential subscribers at depression angles coincident with the elevation pattern maximum, and not at the horizontal plane.

[†] NRPM, at Paragraph 16.



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6. At Paragraph 16 of the NPRM, the Commission concludes that “it would not be necessary for us to collect data on antenna vertical radiation patterns.” As documented by the example in the prior paragraph, the elevation pattern can have a tremendous effect on the EIRP in the horizontal plane. Information on elevation patterns is critical so that potentially impacted parties can check for themselves whether existing stations or cut-off applications are afforded the interference protection to which they are entitled.

7. For relatively flat terrains, the statement at Paragraph 16 of the NPRM, “In most instances, this value [EIRP in the horizontal plane] of EIRP closely approximates the power radiated to the radio horizon, which is most relevant to interference analysis,” is a valid generalization. However, for areas with substantial terrain variation, typical of the western third of the United States, the EIRP in the horizontal plane or at the radio horizon is largely irrelevant. At wireless cable frequencies, terrain obstructions are particularly significant. For the Commission to conduct interference calculations based on a simplistic free space interference algorithm and based only on the EIRP in the horizontal plane would result in the wholesale rejection of designs that would, in reality, not cause interference.

8. Even if the Commission did act as the wireless cable industry’s “big brother,” by using its computer to calculate interference on whatever criteria might ultimately be adopted, this would not result in savings to applicants. Applicants would still need to have prior knowledge of the Commission algorithm, in order to pre-check their designs to ensure they would “pass muster” once submitted to the Commission.

9. Although the Commission proposes to continue to require detailed interference studies for those applications surviving the short-form application process, the use of a Commission interference predicting computer program based simplistically on free-space interference calculations and based only on the EIRP in the horizontal plane would cause many completely sound designs to be rejected at the short-form stage.

III. Support for Some of the Proposed Revisions to Wireless Cable Engineering Rules

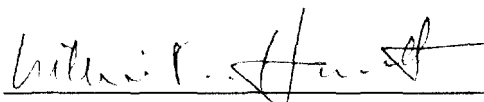
10. We do support adoption of two of the proposed changes to the MDS and ITFS Rules. First, applicants should be able to use any type accepted transmitter they wish, and should be able to employ any transmitter power that meets the maximum EIRP limits and protects all existing stations and applications. Second, although not an engineering rule, the proposal to eliminate the currently required narrative description of why grant of the application would be in the public interest is an excellent idea.

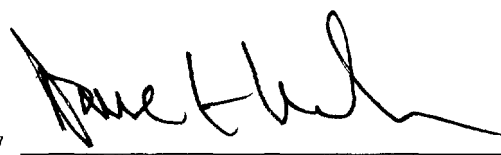


IV. Summary

10. A few aspects of the proposed changes to the wireless cable engineering rules make sense and should be adopted. But the proposal to subject short-form applications to a simplistic computer algorithm with the faults previously discussed would be a disservice to the wireless cable industry and should not be adopted.

Respectfully submitted,

By 
William F. Hammett, P.E.
President

By 
Dane E. Ericksen, P.E.
Senior Engineer

January 6, 1995

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